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The Aviation Day at Mineola

THE Aviation Day held at Curtiss Flying Field under the auspices of the Aero Club of America and with the cooperation of the Curtiss Aeroplane and Motor Corp., afforded the public a convincing demonstration of the safety, reliability and convenience of modern commercial airplanes. Some two score machines, representing half a dozen different types, took off on their various errands, landed, took off again, and so forth, without experiencing the slightest mishap.

Passengers were carried in large number over predetermined routes and according to schedule, and the matter of fact way in which the aerial passengers boarded the machines and stepped off was perhaps the most convincing proof that the public is beginning to look upon aviation as one of the many established means of travel. This is a welcome sign of the times, which augurs well for the comng of regular passenger air lines.

The meeting was held with the underlying idea of showing the public that airplanes, when operated by capable and serious pilots, are just as safe and reliable as any other means of conveyance, and that the cost of traveling in aircraft compares favorably with the older means of transport where air terminals are available. This purpose the meeting fulfilled to the entire satisfaction of all those concerned with the development of commercial aviation, and the organizers of the Aviation Day are warmly to be congratulated on having made possible such a demonstration.

The large attendance which witnessed the various flying tests afforded the best refutation of the belief that New Yorkers do not take any interest in aviation. We believe, however, that if a special effort were made to enable the public better to understand the various flying events, far greater numbers would gather to see an aviation meeting. This is chiefly a question of explaining things clearly on the program and of announcing the events and results likewise from the judges stand. While the evolutions of airplanes, particularly when viewed from close quarters, still possess a considerable amount of fascination for the man in the street, he cannot be expected to take a sustained interest in such events if he has no means of ascertaining of what is really happening.

It would seem that a score board is one of the prime necessities of a flying field, for only in such manner can results be clearly brought to the knowledge of the public, and this should be supplemented by general announcements made through a Magnavox or similar apparatus. It might also be useful to hoist on the judges stand some signal which would indicate to the public that an announcement is about to be made, and which would also warn the pilots to throttle down their engines so the voice of the announcer could be heard. The experience of the Aviation Day shows that when half a dozen airplanes open up their engines even a mechanical megaphone has difficulties in carrying the human voice to the public.

Air Representation

THE announcement that the British government is to be represented on the conference for the limitation of armaments in Washington by its three fighting services, the Navy, the Army and the Air Force, creates a situation which places the United States in a peculiar position. To us it mainly emphasizes the deplorable official status of aviation in this country.

When our representatives will have to consider aircraft problems at the sessions of the conference, the question arises as to who they will turn to for suggestions. To men who have been trained in other arms of the services, but who now hold ranking positions in our air services? Will such advice compare with that received by the statesmen representing foreign countries in which the air force means a separate service with airmen in control? We doubt that it could be as valuable.

This lack of authoritative information places the United States at a decided disadvantage. At a time when British as well as other foreign services are developing secret military and naval aircraft, aircraft carriers and aerial armament, our blindfolded negotiators will be lacking in the essential knowledge which alone would enable them to participate in the discussion with full understanding.

Subsidies for Air-Transport

RECENT experience abroad indicates that the aircraft subsidies are not proving to be the unmixed blessing that many people would like to believe. The trouble is not the fact that subsidies are granted, but rather in the form which they take. Certainly no reasonable person will question the importance of building up air-transportation if, as most of us believe, it is eventually going to suport itself. But whatever is done, this object must always be kept in mind.

Most of the present government aid in Europe, is essentially a subsidy based on mileage flown. This serves a useful purpose in days gone by when it was a great question whether any kind of a regular service could be maintained. Now however, it is not so much a matter of actual flying as of improvements in equipment, to bring aviation more into the self supporting class.

If anything, the present subsidies discourage the very technical development which is most important for the future, by putting a premium on mere flying and insuring profits on the use of all kinds of old equipment which would otherwise be promptly discarded. It seems increasingly clear that the subsidy which would pay the biggest dividends to the country must be one based primarily on development rather than on routine performance.

New U. S. Mail Airplane, Type DH-M2

Civil aviation has been developing very slowly in this country in comparison with the rapid strides it has made abroad. This has been due to a series of causes, probably one of the main ones being the lack of government inspection and supervision of aircraft which is rigidly enforced in Europe with remarkable results in attaining safe flying.

There has been just one form of civil aviation that has had a steady, healthy development in this country until its efficiency figures at the present time have reached such a high standard that it can no longer be treated as a plaything and ignored by far sighted men. The branch of aviation referred to is the U. S. Air Mail Service, which, under the guidance of able and progressive men, has developed from a plaything to an organization which is carrying the mail about as cheaply as the railroads and excelling them in speed and efficiency at every turn.

THE NEW U. S. MAIL AIRPLANE, MODEL DH-M2, DEVELOPED BY THE WITTEMANN AIRCRAFT CORP. FROM THE DH-4 ARMY OBSERVATION AIRPLANE

At the close of the War, there was on hand a tremendous amount of new aviation equipment and machines, and this was made available for the postal service. Although none of the machines available were ideal for the Air Mail Service, the DeHaviland-4, a two-place day bomber and fighting machine, was considered the best, particularly as the Air Mail was still in its experimental stages, and the price of new machines was prohibitive. The DeHaviland-4 type was slightly remodeled, that is, the pilot's seat was moved aft and the bomber's gun ring removed, while the forward cockpit which was the original pilot's seat was changed into a mail compartment.

These machines proved very successful as they were fast and reliable, but there was one great drawback, i.e., their inability to carry more than 400 lb. of mail satisfactorily. The men in charge of the Air Mail continually tried to improve this type and some of these machines were turned into twin-engined ships, in others the wing area was increased, but in every case a logy unsatisfactory ship was produced.

This summer the Wittemann Aircraft Corp. entered into an agreement with the postal authorities to remodel one of these ships along new lines and double its carrying capacity without altering its speed, with the result that the airplane No. 250, known as the DHM2 Type was produced, which has exceeded in performance even the claims made for it by its designer.

Many minor refinements were embodied in this new design, besides changes in construction. Among the latter, first, the engine bed was raised four inches, which brought the line of thrust of the engine more directly down the center line of the fuselage. Second, the cowling of the fuselage was remodelled to provide for a larger mail compartment, and to improve the general streamlining of the fuselage. Third, the span was increased by 6 ft. on both the upper and lower wings. This was done by adding stub planes on each side of the fuselage and building a new and larger center section, and in doing this, wires were replaced by struts and the head resistance considerably decreased. There were many other changes made, but these were the most radical.

Ordway Webster, test pilot of the Air Mail Service, never experienced any difficulties with the ship No. 250 from the very start, and on a series of elaborate and carefully made test flights, attained the following results.

Without any special adjustments to the engine or fairing of the wires, and with a load of 850 lb. of mail, this ship attained a speed of 122 m.p.h. and a climb of 900 ft. per minute at the ground with an absolute ceiling of 17,300 ft. and a service ceiling of 15,000 ft. The distance of take off of this ship with the 850 lb. of load, compared with a regular DeHaviland-4 with a 400 lb. load, proved to be practically the same, and the gasoline consumption at cruising speed showed a saving of as high as three gallons an hour. On a special test flight, this ship carried a sand load of 1100 lb. and handled perfectly.

The original ship No. 250 is now in service in the West carrying an 850 lb. load and giving a most favorable account of herself. The Air Mail Service, by the use of this type of ship, is still further increasing its already high standard of efficiency as the new machines are more than doubling the amount of mail carried at the same speed with the same number of ships and pilots, and with an improved gasoline consumption.

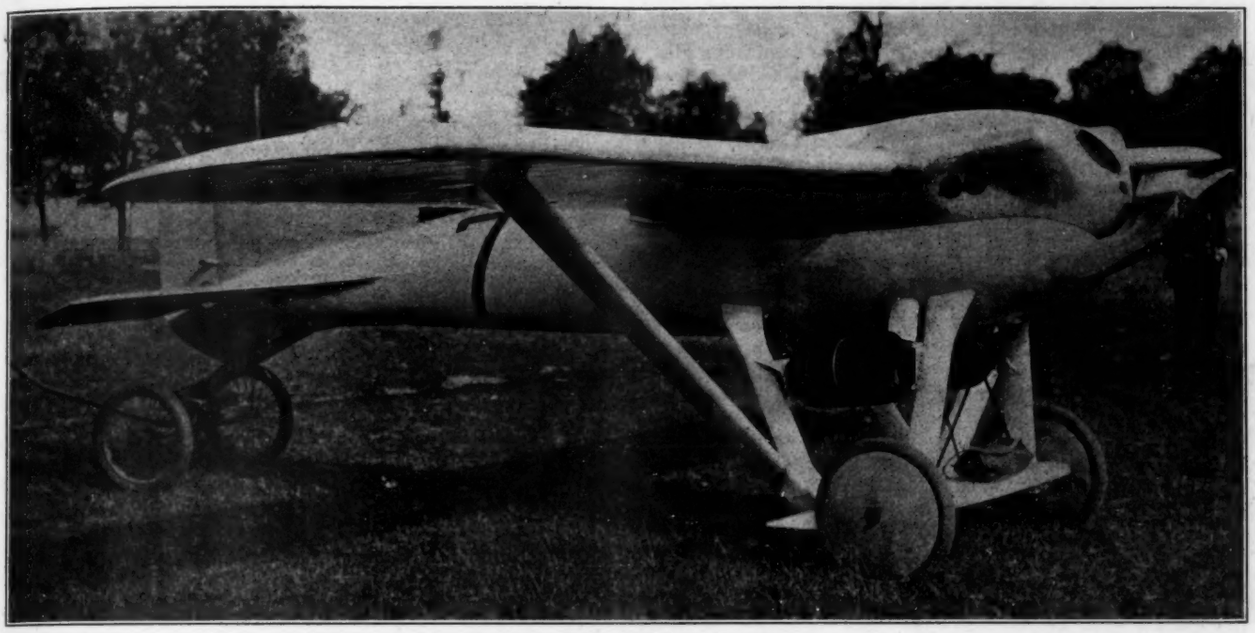
Erection of the "Roma" under Way

The airship "Roma", recently purchased from Italy, and delivered to Langley Field, is being erected in the huge hangar at that Field. Inflation of the envelope started Sept. 21, and by Friday, the 23rd, over 1,000,000 cu. ft. of hydrogen had been fed through two six-inch gas lines.

The 'Roma" entirely fills the 410 ft. hangar, necessitating mooring the D-3 to the Vickers mast in the open.

Due to the great amount of rigging yet to be attached, and the fineness of adjustment for this rigging, it is estimated that the "Roma" will not be ready to fly before Jan. 1, 1922.

The Deutsch de la Meurthe Trophy Race



THE NIEUPORT-DELAGE "SESQUIPLANE" ON WHICH GEORGES KIRSCH WON THE FIRST DEUTSCH DE LA MEURTHE TROPHY RACE AT AN AVERAGE SPEED OF 173 M.P.H.

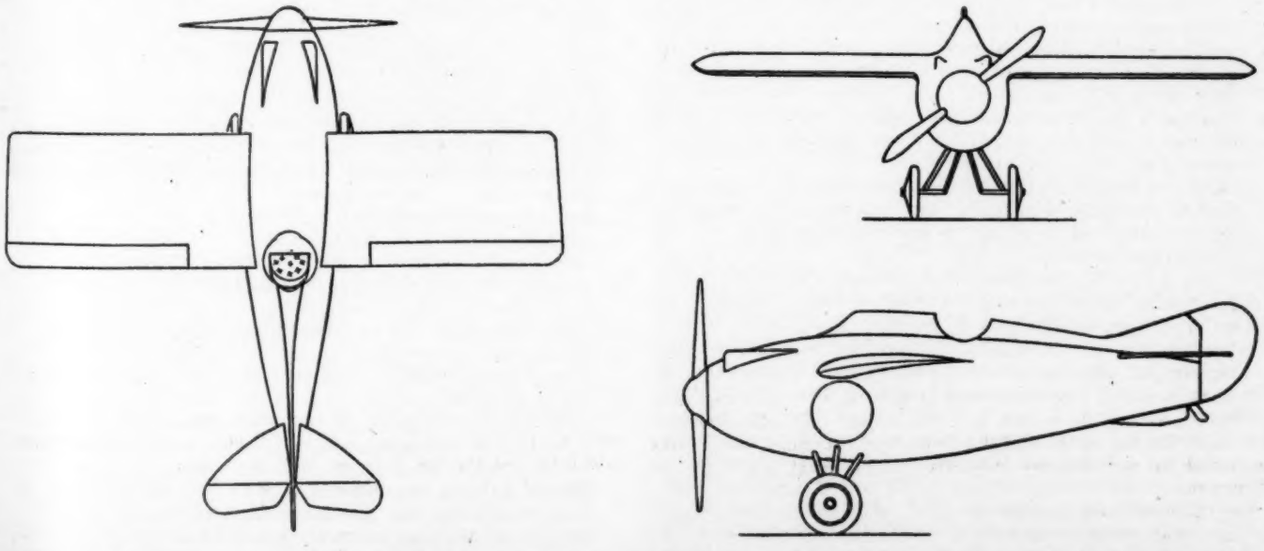
The first international race for the Henry Deutsch de la Meurthe Cup took place on Oct. 1, at Etampes, France, and was won by the French entrant Georges Kirsch on a Nieuport-Delage "sesquiplane" fitted with the 300 hp. Hispano-Suiza engine. He covered the 300 km. (187.5 miles) course in 1 hr. 4 min. 39 sec., which works out as an average of 173 m.p.h.

Incidents of the Race

Of the other two pilots of the French team, who also flew Nieuport-Delage "sesquiplanes", Lieutenant Lasne finished second, while Sadi Lecointe, the favorite of the race, was forced out by a crash landing. The causes of this accident are not definitely known, but it appears that the propeller of his machine either came off, or else was shattered by a bird which flew into it, and the pieces badly damaged the wings, partly ripping off the canvas. Although the machine was totally wrecked in the high speed landing, Sadi Lecointe had a miraculous escape for while he was found to suffer from severe bruises, he was otherwise uninjured.

The British entrant, J. H. James, flying a Gloucestershire 'Mars I" fitted with the 450 hp. Napier Lion engine, abandoned on the second lap when on his machine too the canvas began stripping off the wings. It is significant that a week previously an accident due to the same cause resulted in the death of Bernard de Romanet, one of the most skillful French test and race pilots, when he was flying a de-Monge racing biplane which was to participate in the Deutsch race.

The Italian entrant, Brak Papa, flying a Fiat biplane fitted with the 700 hp. Fiat engine, also abandoned on the second lap, owing to loss of pressure in the fuel tank.



OUTLINE DRAWINGS OF THE HANRIOT HD-22 RACER FITTED WITH THE 300 HP. HISPANO-SUIZA ENGINE. THE LANDING GEAR IS RETRACTABLE

The Machines

The Nieuport-Delage "sesquiplanes" which triumphed in the Deutsch race over its far more heavily engined British and Italian competitors is a rigid truss monoplane which carries an additional lifting surface around the axle. It is due to this "half plane" that the machine is called a "sesquiplane", (one-and-a-half plane). As may be seen from Fig. 1, the machine is very highly streamlined so as to reduce parasite resistance to a minimum. The neat way of mounting the Lamblin radiators on the landing gear Vees is particularly noteworthy.

Another very interesting French machine which was built for the Deutsch Cup, but which did not qualify in the eliminatory race for the selection of a French team, was the Hanriot HD-22 racer fitted with a 300 hp. Hispano-Suiza engine. This machine, the outlined drawings of which are shown in Fig. 2, is an all-metal cantilever monoplane with retractable landing gear. Reliable figures on the speed which the machine actually attained in flight are not on hand, but the calculated speed is stated to be over 220 m.p.h.

The de Monge racer, which was eliminated from the race by the accident which cost de Romanet's life, was designed to be flown either as a rigid truss monoplane or as a biplane. Rigged as a biplane the machine is said to have attained in its preliminary tests a speed of 198 m.p.h., and a much higher figure was anticipated when the machine would be flown as a monoplane.

The Gloucestershire "Mars I", which was the British entrant, is the same machine which won the last Aerial Derby around London*, but some minor refinements were introduced in it with a view to increasing its speed. In the Aerial Derby the Mars I made an average speed of 163 m.p.h., but in the first lap of the Deutsch Cup race J. H. James, who piloted the machine, is reported to have attained a speed of 172 m.p.h. It is not known whether the latter figure refers to the average for the lap, or merely the maximum speed attained on a straight away. However that be, the performance of the British contestant was, as far as design efficiency is concerned far below that of the French sesquiplanes, considering that the horsepower of the latter was 320 hp. as against 450 for the Briton.

The same remark applies to a certain degree to the Fiat racer flown by Brak Papa, which had more than twice the horsepower of the French entries, namely 700, but did not exceed 185 m.p.h. on the first lap of the race. Unfortunately no detailed information is available regarding this racer.

Following are given in tabulated form the principal data, as far as known, of the airplanes built for the Deutsch Cup race:

	Nieuport	*de Monge**	*Hanriot*	*Mars I*
Span	26′ 4″	26′ 3″	20′ 10″	22′
Length overall	20′	23′	18′ 8″	23′
Total wing area, sq. ft.	107	217	81	205
Horsepower	320	320	320	450
Weight loaded, lb.	1980	2100	1650	2500
Wing loading	18.4	9.7	20.4	12.0

* The figures given refer to the machine rigged as a biplane. As a monoplane the total wing area is 163 sq. ft., and wing loading 12. 9 lb./hp.

Monoplanes or Biplanes?

Editor, AVIATION AND AIRCRAFT JOURNAL:

In the editorial comment on the article "Monoplanes or Biplanes?" you compare the Figure of Merit proposed by me with the figure "pounds pay load per hp." and state that it has the merit of simplicity.

I would like to point out that this figure as used by M. Herbemont is practically the same thing as the Figure of Merit because M. Herbemont compares machines when other factors are equal, including speed and range; both of which are included in my Figure of Merit.

The article states that the pay load is calculated on the basis of a range of 310 miles and a head wind of 33 feet per second. On this basis the pay load for the JL-6 should be approximately 890 pounds giving 4.81 pounds pay load per hp. The figure of 655 pounds corresponds to seven hours flight. This reduces the great discrepancy between M. Herbemont's rating and my own.

DONALD W. MCILHINEY

Legislation and Insurance

A letter from R. R. Blythe regarding the effect of the pending Wadsworth Bill on aircraft insurance shows the stabilizing effect regulation would produce.

After mentioning the reluctance which foreign insurance companies have in doing business where flight is unregulated he states:

"The long waited for legislation and registration of commercial aircraft and pilots appears to at least be receiving the serious consideration of the government through the above bill which at the present time appears to be in all respects a very noteworthy legislation. As Senator Wadsworth states, this bill is urgently required and heartily endorsed by all those connected with aviation. As a matter of fact, not only those directly or indirectly connected with aviation should be very vitally interested in this bill, but the people in general should realize that such legislation will increase their safety while actually engaged in flying as passengers or while the planes are flying over-head.

"It is also of importance that legislation should be made for the protection of property damage caused by falling planes or articles being dropped therefrom. Immediately this legislation has been enacted the foreign industrial organizations will realize that through this act their capital investment will be protected and a certain amount of government control may be relied upon. This stands equally with the foreign aircraft underwriting insurance companies who have previously entered the market and through a costly experience have been forced to retire from underwriting in the United States.

"The policies as issued today incorporate what is known as the 75 per cent loss payable feature, whereby the company pays ¾ of each loss (or ¾ of the excess portion of each loss for each coverage that bears a deductible feature.) This has only been done so that a greater care will be taken in the upkeep and operation of the machines. With government legislature it should not be necessary to take this step of making the flier suffer a portion of his own loss in case of accident. In the cases of all losses there is also incorporated the use of a 5 and 10 per cent deductible clause, that is to say, in each loss the owner bears 5 per cent and the companies the remainder.

"There are also limitations in the policies which could be eliminated if proper legislation was put into effect. When the aircraft can be covered by the insurance companies against all hazards at reasonable rates with a broad form of coverage the financiers will see protection for their investment. Where today an investor feels in the aircraft industry there is neither Government or insurance protection for his investment he hesitates to place implicit confidence in the plane and ability of pilot to carry through the plans laid out, when there are such hazards to be considered as windstorms, lightning, liability and property damage; poorly regulated landing fields and no control for the aerial route, or time and class of flying. The adoption by the Government of Senator Wadsworth's bill S2448 will be the greatest move America has ever made to protect a new industry and further its adoption by the public for general use.

"The result would be that aircraft transportation companies operating on a larger scale with sound financial organizations backing them up forming public utility companies for passenger carrying and general traffic there will be better insurance protection for the investment placed therein and the public will feel that where the insurance companies are willing to accept all risks that it is at least worthy of serious consideration."

* See AVIATION AND AIRCRAFT JOURNAL for Aug. 22, 1921

The Larsen Aerial Efficiency Trophy

Announcement from Omaha that an efficiency trophy would be contested for at the International Aero Congress, November 3, 4 and 5 at that city has created great interest in the aeronautical industry. In a letter of October 3, formally tendering the trophy to the Aero Club of America, the donor, John M. Larsen, said:

THE AERO CLUB OF AMERICA, October 3, 1921
NEW YORK CITY
GENTLEMEN:

I hereby offer the Aero Club of America a trophy to be known as the "Larsen Aerial Efficiency Trophy" to be competed for annually under the supervision of the Contest Committee.

It is understood that the aero club represented by the entrant of the winning airplane in any year shall be entitled to possession of the trophy until one month before the next successive competition. The Aero Club winning this Trophy shall have the privilege of conducting the contest for

JOHN M. LARSEN, DONOR OF THE LARSEN AERIAL EFFICIENCY TROPHY

the trophy the next succeeding year provided it signifies its intention of doing so to the Aero Club of America within six months of winning same. Should the club winning fail to make due preparation for the contest of such a meet for said trophy before the expiration of six months then the right to conduct the meets rests in the Aero Club of America.

The following conditions shall govern the contest.

The winning plane will be that machine which obtains the highest factor based on the formula,

$$\frac{(W - T)\ S}{g}$$

where W represents the actual total weight of the machine and load leaving the ground.

T represents the tare of the machine including all instruments, water (if any) and oil, the radiator, leads, reservoirs and water connections all being filled to full capacity, and the oil tank or tanks filled to full capacity.

S represents the speed in miles per hour of the machine actually made over the full course in the contest.

g represents the actual amount of gasoline consumed in gallons on the whole flight of the contest including amount used in warming up and idling the motor; the course to consist of not less than 250 miles and must be flown in one continuous flight, non-stop.

The donor reserves the privilege of changing the conditions by and with the advice and approval of the Contest Committee of the Aero Club.

Your truly,
JOHN M. LARSEN

Gutzon Barglum, the noted American sculptor, is the designer of the new efficiency trophy which will be of gold and silver. The design takes the form of a massive globe supported on the backs of four tortoises. At the top of the globe stand two figures holding aloft a conventionalized transport monoplane. One figure represents an American war pilot while the other typifies a skilled American artisan. The symbolism carries the design from the tortoise-like speed of ancient transport to the fleetness of the modern airplane supported as it is by the advances gained from war aviation as typified in the pilot and artisan. The design gains strength from its simplicity and absence of minor decorative detail. The trophy is valued at $8,000. With its base it stands nearly four feet high.

John M. Larsen, donor of the trophy, has become a widely known figure in the aircraft industry during the past few years. He is also a refrigerating engineer of national reputation. Mr. Larsen has probably flown more miles than any other airplane passenger. These flights include round trips from coast to coast, New York to Mexico City, New York to Edmonton, Alberta and north almost to the Arctic Circle, as well as many long distance flights throughout Europe.

Progress in Airplane Engines

Supercharging. It is a recognized fact that supercharging is necessary on all airplane engines, especially on those used for military purposes. The present demands are that the supercharger maintains sea level horsepower to 20,000 ft. altitude, that it be simple and reliable in construction, be of light weight and automatic in operation.

The root type supercharger developed at Langley Field, is a positive driven from the crankshaft of the engine, and on dynamometer tests under altitude conditions has shown characteristics superior to other types of air compressors so far used for this purpose. It is now being installed in a DH4B airplane and will be flight tested at Langley Field.

Superchargers of the direct driven type will also be tested in the altitude chamber at the Bureau of Standards to determine the performance of the combined tests for comparison with the maximum possible performance. The maximum possible performance will be obtained by operation of the engine in the altitude chamber and supplying air to the carburetor at sea level pressure with the pressures at the exhaust valve and in the crankcase reduced to given altitude.

Fuel Injection Engine. The most important power plant problem of aircraft is the development of an engine that will use a fuel having a lower flash point and eliminate the fire hazard. This type of engine also lends itself to a design that will give maximum fuel economy and maximum reliability.

This problem has been under way at Langley Field for some time, and a careful study is being made of the fundamentals of the problem as the application of direct fuel injection for high speed internal combustion engines has never been undertaken.

The determination of the proper cycle of operation, the type of injuction nozzle, injection pressure is being determined. The unit cylinder has been designed and will be in operation about Dec. 15.

Fuel for High Compression Engines. The most severe limitation is now being placed on the further development of the present type of high powered, light weight engines due to the preignition or erratic burning of the normal ignition of a highly compressed cylinder charge of air and the vapor of gasoline available. The addition of rather large percentages of benzol, or small percentages of analine and other compounds has been resorted to, to make possible the use of higher compression pressure.

An investigation will be made of the various fuels on an engine cylinder in which the compression ratios can be varied to determine the best and most economical fuel available for use in our present type high compression engines.

Airplane Radiators. The radiator investigation will be continued and all new types will be tested, and tests will be made to measure the actual weight of air flowing through radiators in flight.

Phenomena of Combustion. With the increase in compression of the present type aircraft engine, the temperature and pressure of the explosive mixture has resulted in extraordinarily high rates of combustion, which have so far been beyond control. By the investigation of rates of combustion, it is believed that information will be obtained which will indicate fundamental methods by which the rates of combustion in engine cylinders can be controlled.—*Report of the Committee on Power Plants for Aircraft, N.A.C.A., submitted at annual meeting, Oct. 6, 1921.*

Test of All-Metal Junkers Airplane Wing

In view of the charge made that all-metal construction for airplanes is not what it is cracked up to be—that is is easily affected by the weather and repairs en route are difficult to make, and more—the following note on a recent test of a Junkers metal-wing structure made by the Engineering Division of the U. S. Army Air Service, is of interest.

The photograph illustrates the internal construction of the wing and one will note the great thickness of the wing section and the extent to which tubular and corrugated sheet duralumin has been used, the only steel parts being those which show black.

The wings are covered both sides with corrugated sheet duralumin which is fastened to all of the spar tubes by lines of duralumin rivets spaced about two inches apart along the entire length of the tubes. The workmanship was good and the design and construction found to be efficient and dependable. Steel rivets were used for holding members to steel fittings and parts, but only duralumin rivets were employed for holding duralumin to other duralumin. Although the Germans held to welding for uniting steel parts, no welding or soldering of duralumin was attempted in these wings.

JUNKERS WING WITH UPPER SURFACE REMOVED TO SHOW INTERNAL STRUCTURE. BLACK FITTINGS ARE OF STEEL

Some of the shortcomings may be mentioned. The necks of some of the steel coupling parts were machined a little thin and the threads of some of the couplings were loose. The ductility of the tubing was erratic. The tension test specimens necked very little and broke suddenly. Elongation varied from 3 to 20 per cent and averaged 6 per cent. The sheet duralumin showed a wide range in tensile strength, thought to be due to the fact that some specimens had been affected by oxidation more than others. Many specimens showed very little ductility and, in fact, had a crystallized or granular appearance in the break. The elongation varied from 0.5 to 6 per cent and averaged about 1.5 per cent.

The wings had been given a coat of lacquer and had been painted green on the outside, but most of this had long since disappeared, leaving the sheet duralumin exposed to the elements. Much of the sheeting was, therefore, oxidized and weakened. Inside the wing, all parts were coated with lacquer, excepting the steel fittings which had been varnished.

The duralumin tubing was smooth, even in gage and size and had a tensile strength of approximately 50,000 lb. per square inch for the smaller tubes, and a little less for the larger ones. The workmanship throughout was good. No welds failed, though sometimes couplings, splices and riveted joints failed and in other instances the attached tubing failed outside the joints, which was taken to indicate well balanced design.

The chemical composition of the duralumin samples from the wing averaged as follows:

Silicon	0.51
Copper	3.34
Iron	.81
Magnesium	.59
Manganese	.15
Aluminum	94.60

The large duralumin torque tube in the center has an eccentric action, since it is supported by hinge joints on the sides of the steel fittings. Its supporting trusses at the ends are of steel tubing, torch welded.

Training 170 Flying Cadets

The Air Service has been authorized to make preliminary arrangement for the securing and training of 170 additional flying cadets. Sufficient money is available out of the current fiscal year's appropriations to provide pay for that many and other expenses incident to their training, and there is sufficient airplane equipment. The only difficulty lies in the lack of funds for transportation of the candidates from their homes to the flying-training centers. The Air Service is informing those who have made application for the training, and it is expected by Jan. 1, 1922, or soon thereafter, funds will be available for their transportation.

Key West—Havana Service to Resume

The Aeromarine Airways will continue this winter a service between Key West and Havana with five ten-passenger flying boats of the Santa Maria type. This particular route reduces the time of travel between Key West and Havana from seven hours (by boat) to seventy-five minutes; a saving of time and inconvenience which last winter was greatly appreciated by the traveling public as indicated by the number of passengers carried without accident.

Canadian Airharbors

(Continued from our last issue)

Nova Scotia

Dartmouth, N. S. Seaplane station. Situated 4 miles S.E. of the City of Dartmouth opposite north end of McNab Island. Latitude 44 deg. 38 min.; longitude 63 deg. 31 min. Local magnetic variation 22 deg. 7 min. W, of N. Altitude—sea level. Maximum dimensions for landing—over 800 yds. Licensed for use by day only and marked with an equilateral triangle each side of which is 3 ft. wide and 25 ft. long, thus: 5,e.

Directional wind indicator on hangar. Telephone connection. Telegraph and telegraphic address—Air Board Station, Dartmouth, N. S. Water and fuel supply. Facilities for repairs. Hangar accommodation and a handling party stationed at the airharbour. Available communication to the City of Dartmouth—motor transport, good roads.

Licensee—The Air Board, Ottawa, Ont.

License No. 39. Issued 2-3-21.

Ontario

Niagara Falls, Ont. Commercial airharbor. Situated on Niagara River two miles south of Niagara Falls, Ont. Altitude 550 ft. above sea level. Maximum dimensions for landing—under 300 yds. Licensed for use by day only and marked with a triangle divided by two lines forming a cross into four approximately equal parts, thus 1,e.

Water and fuel supply. Hangar accommodation. Facilities for minor repairs only. Available communication to Niagara Falls,—electric railway, motor transport, good roads.

Licensee—Niagara Air Service, 618 Dominion Bank Bldg., Toronto, Ont.

License No. 48. Issued 8-9-21.

Leaside, Ontario. Customs airharbor (Lat. 43 deg. 42 min. N., Long. 79 deg. 21 min. W) situated on the North East edge of the City of Toronto, six miles north of Lake Ontario. Altitude—426 deg. above sea level. Dimensions—400 by 600 yards. Licensed for use by day only and marked with a square and circle inserted, divided in equal parts by a vertical line thus: 3, d.

Customs personnel on duty when notified at the Collector of Customs' Office, Toronto, Ont. Directional wind indicator on hangar. Telephone connection and water supply. There are facilities for repairs, fuel supply, machine accommodation and a handling party stationed on the aerodrome.

Available communication to the City of Toronto—Motor bus and trolley at Yonge Street, 3½ miles west of the aerodrome. One mile by road to Leaside Station. Good roads.

Licensee—The Ericson Aircraft Limited, 120 King Street East, Toronto, Ont.

License No. 24. Issued 25-7-21.

Deseronto, Ont. Customs airharbor (Lat. 44 deg. 10 min. N. Long. 77 deg. .08 min. W) about 3½ miles west of the Town of Deseronto, Ont. Altitude, 260 feet above sea level. Dimensions, 440 yards N & S by 800 yards E & W. Licensed for use by day only and marked with a double cross barred square and enclosed circle, thus: 2 c.

Customs personnel on duty only when notified, at Deseronto Customs House. Directional wind indicator in South Eastern Corner. Telephone connection fuel and water supply. Road communication good; rail communication—C. N. R. 50 yards. Facilities for general repairs.

Licensee:-G. H. Harrold, Deseronto, Ont.

License No. 32. Issued 13-8-20.

Rockliffe, Ottawa, Ont. Airplane and seaplane station. Situated on the right bank of the Ottawa River, east of Rockcliffe Rifle Range butts, opposite the center of Kettle Island. Latitude 45 deg. 28 min.; longitude 75 deg. 39 min. Local magnetic variation 13 deg. 07 min. W of N. Altitude 200 feet above sea level. Maximum dimensions for landing—700 yards x 400 yards. Licensed for use by day only and marked with a triangle divided by two lines forming a cross into four approximately equal parts, thus: 1, e.

Directional wind indicator on top of Rockliffe Rifle Range butts. Water and fuel supply (pipe line for seaplanes). Hangar and mooring accommodation. Handling party stationed on the airdrome. Available communication to the City of Ottawa—electric railway, motor transport. Good roads.

Licensee—The Air Board, Ottawa, Ontario.

License No. 30. Issued 28-7-20.

Camp Borden, Ont. Airharbor (military and civil Government) Situated 4 miles S. W. of Angus, Ont. and 15 miles S. W. of Barrie, Ont. Latitude 44 deg. 17 min.; longitude 79 deg. 56 min. Altitude 627 min. above sea level. Local magnetic variation 6 deg. W of N. Maximum dimensions for landing—1 mile by 2 miles. Licensed for use by day only and marked with an equilateral triangle each side of which is 3 ft. wide and 25 ft. long (inside measurement), thus: 5,e.

Directional wind indicators attached on 6th and 12th hangars from the north. Telephone—Barrie 435. Facilities for repairs. Water and fuel supply. Machine accommodation and a handling party stationed on the airdrome. Available communication to Angus, Ont.—motor cars can be obtained by telephone. Good road for two miles—remaining distance sand road.

Licensee—The Air Board, Ottawa, Ont.

License No. 27. Issued 19-7-20.

Sault Ste. Marie, Ont. Commercial seaplane station. Situated on St. Mary's River near the Imperial Oil Co.'s dock. Latitude 46 deg. 31 min.; longitude 84 deg. 21 min. Altitude 583 min. above sea level. Local magnetic variation—3 deg W of N. Maximum dimensions for landing—over 800 yds. Licensed for use by day only and marked with an equilateral triangle each side of which is 3 min. wide and 25 min. long, thus: 5, e.

Telephone connection. Telegraph and telegraphic address Spanish River Pulp & Paper Mills Ltd., Sault Ste. Marie, Ont. Water and fuel supply. Mooring accommodation. Facilities for minor repairs. Available communication to city of Sault Ste. Marie, Ont.—Electric railway 200 yds. in a northerly direction, motor transport, good roads.

Licensee—Spanish River Pulp & Paper Mills, Ltd., Sault Ste. Marie, Ont.

License No. 18. Issued 7-6-20.

Armour Heights, Ontario. (Near Toronto). Customs airharbor (Lat. 43 deg. 43 min. N. Long. 79 deg. 24 min. W) about 1½ miles north west of Stop 26, Metropolitan Railway, York Township, Ontario. Alt. 540 ft. above sea level. Dimensions, 400 yards in circular diameter. Licensed for use by day only and marked with a square and circle inserted divided in equal parts by a vertical line thus: 3,d.

Customs personnel on duty only when notified at Toronto Customs House. Directional wind indicator in North Eastern Corner. Telephone connection and water supply. There are facilities for repair, fuel supply and machine accommodation and a handling party stationed on the aerodrome.

Available communication to City—Electric Railway 1 mile from airdrome. Good roads.

Licensee—Bishop-Barker Aeroplanes Limited, 93 Spadina Ave., Toronto, Ontario.

License No. 10. Issued 17-5-20.

Province of Quebec

Hampstead, P. Q. Commercial airharbor. Situated ½ mile north of the town of Hampstead (near Montreal) P. Q. Mount Royal two miles S. E. Blue Bonnet Race Track ½ mile north. Latitude 45 deg. 33 min.; longitude 73 deg. 42 min. Altitude 125 feet above sea level. Local magnetic variation 15 deg. 9 min. W of N. Maximum dimensions for landing—Under 300 yards. Licensed for use by day only and marked with a triangle divided by two lines forming a cross into four approximately equal parts, thus: 1, e.

Water and fuel supply. Facilities for running repairs only. No machine accommodation. Available communication to the City of Montreal—¼ mile to electric railway; good roads.

Licensee—Plante Aerial Service, 161 Craig Street West, Montreal, P. Q.

License No. 40. Issued 18-2-21.

Chicoutimi, P. Q. Commercial seaplane station. Situated on the Saguenay River west of the town of Chicoutimi, P. Q. Latitude 48 deg. 30 min.; longitude 71 deg. 05 min. Altitude—sea level. Local magnetic variation 21 deg. 04 min W. of N. Maximum dimensions for landing—over 800 yds. Licensed for use by day only and marked with an equilateral triangle each side of which is 3 ft. wide and 25 ft. long, thus: 5,e.

Directional wind indicator on hangar. Telephone number 437 Chicoutimi. Fuel and water supply. Facilities for minor repairs. Hangar accommodation. Type of transport available locally—train, taxis, Saguenay River boats.

Licensee—Price Bros. & Co., Ltd., Chicoutimi, P. Q.

License No. 29. Issued 23-7-20.

Roberval, P. Q. Commercial seaplane station. Situated at north end of town of Roberval, Lake St. John, P. Q. Latitude 48 deg. 32 min.; longitude 72 deg. 13 min. Altitude 350 ft. above sea level. Local magnetic variation 20 deg. 5 min. W of N. Maximum dimensions for landing—over 800 yds. Licensed for use by day only and marked with an equilateral triangle each side of which is 3 ft. wide and 25 ft. long, thus: 5,e.

Telephone connection. Water and fuel supply. Facilities for repairs. Hangar and mooring accommodation. Available communication to town of Roberval—motor boat and motor transport.

Licensee—The Air Board, Ottawa, Ont.

License No. 28. Issued 22-7-20.

Lac a la Tortue, P. Q. Commercial seaplane station. Situated ¼ mile east of Lac a la Tortue and 3 miles S.E. of Grand 'Mere, P. Q. Latitude 46 deg. 36 min.; longitude 72 deg. 40 min. Altitude 430 feet above sea level. Local magnetic variation 18 deg. 2 min. W of N. Maximum dimensions for landing—over 800 yards. Licensed for use by day only and marked with an equilateral triangle each side of which is 3 ft. wide and 25 ft. long (inside measurement), thus: 5,e.

Directional wind indicator on hangar. Telephone number 109 ring 31. Water and fuel supply. Facilities for minor repairs. Hangar accommodation. Handling party stationed at airharbor. Available communication—good roads (sand), taxis to village.

Licensee—Laurentide Company Ltd., Grand 'Mere, P. Q.

License No. 16. Issued 2-6-20.

Montreal, P. Q. Customs airharbor (Lat. 45 deg 30 min. N; Long. 73 deg. 40 min. N) approximately seven miles north of the City of Montreal near the Town of St. Laurent. Altitude, 140 feet above sea level. Dimensions, 750 yards N & S by 400 yards E & W. Licensed for use by day only and marked with double cross barred square surrounding a circle, thus: 2,c.

Customs personnel on duty only when notified at Montreal Customs House. Telephone, gasoline, oil and water supplies are available and handling party is stationed on the airdrome. There are two hangars in north end of airdrome. Repairs can be carried out. A wind indicator is placed on N. W. corner.

Communication—Road, Steam and Electric Railway.

Licensee—Canadian Division of the Aerial League of the British Empire.

Operated by R. & W. Air Service.

License No. 8. Issued 3-7-20.

Saskatchewan

Moose Jaw, Sask., Customs airharbor (Lat. 50 deg. 24 min. N., Long. 105 deg. 34 min. W) situated in Lynbrook Heights addition to the City of Moose Jaw. Altitude—1865 ft. above sea level—dimensions—400 yards N & S—700 yards E & W—licensed for use by day only, and marked with a square and circle inserted divided in equal parts by a vertical line, thus: 3,d.

Customs personnel on duty when notified at the Collector of Customs' Office, Moose Jaw. Directional wind indicator, on western side of airdrome. Telephone connection and water supply. There are facilities for repair, fuel supply and machine accommodation and a handling party stationed on the airdrome.

Available communication to City—Electric Railway adjoining airdrome. Good roads.

Licensee—City of Moose Jaw, Sask.

Operated by the Western Aeroplane Co., Ltd., Moose Jaw, Sask.

License No. 42. Issued 25-5-21.

Yorkton, Sask. Commercial airharbor. Situated on the north half of section 18, township 26, range 3, west of the 2nd. Latitude 51 deg. 16 min.; longitude 102 deg. 33 min. Altitude 1655 ft. above sea level. Local magnetic variation 19 deg. 2 min. E of N. Maximum dimensions for landing—under 300 yds. Licensed for use by day only and marked with a triangle divided by two straight lines forming a cross into four approximately equal parts, thus: 1,e.

Telephone connection. Telegraph and telegraphic address—Yorkton Aerial Transport Co., Yorkton, Sask. Water and fuel supply. Facilities for minor repairs only. Available communication to the town of Yorkton—motor transport, dirt roads.

Licensee—Donald Brown, Yorkton, Sask.

License No. 33. Issued 10-8-20.

Saskatoon, Sask. Commercial airharbor. Situated 2 miles N.W. of Saskatoon Post Office. Latitude 52 deg. 08 min.; longitude 106 deg. 43 min. Altitude 1640 ft. above sea level. Local magnetic variation 23 deg. 5 min E of N. Maximum dimensions for landing 300 x 400 yards. Licensed for use by day only and marked with a triangle divided by two lines forming a cross into four approximately equal parts, thus: 1,e.

Directional wind indicator in hangar. Telephone 5221. Telegraph and telegraphic address—McClelland Aircraft, 104 Cobbold Block, Saskatoon, Sask. Water and fuel supply. Facilities for repair to Curtiss J.N.4 machines. Accommodation for one machine. Available communication to the City of Saskatoon—motor transport, dirt roads.

Licensee—McClelland Aircraft Ltd., 104 Cobbold Block, Saskatoon, Sask.

License No. 2. Issued 22-4-20.

Regina, Sask. Commercial airharbor. Situated S.W. of the City of Regina, Sask., near the Parliament Buildings. Latitude 50 deg. 25 min.; longitude 104 deg. 39 min. Altitude 1890 ft. above sea level. Local magnetic variation 19 deg. 2 min. E. of N. Maximum dimensions for landing—over 800 yds. Licensed for use by day only and marked with an equilateral triangle each side of which is 3 ft. wide and 25 ft. long, thus: 5,e.

Directional wind indicator on hangar. Telephone connection. Water and fuel supply. Hangar accommodation and facilities for minor repairs only. Available communication to City of Regina—electric railway, motor transport, good roads.

Licensee—Aerial Service Co., Box 285, Regina, Sask.

License No. 1. Issued 22-4-20.

Reorganization of Air Service

Orders issued by the War Department for reorganization of the Air Service at reduced strength include the following:

The following units are to be organized at the stations indicated. Where permanent station is different we add it in parentheses.

15th Squadron (Observation), reduced, Chanute Field; 16th, (Observation), Fort Riley; 18th (Observation) Rockwell Field.

19th (Pursuit) and 23rd (Bombardment), March Field (Oahu); 24th (Pursuit) and 25th (Bombardment), Mitchel Field (Panama); 26th (Attack), Kelly Field; 28th (Bombardment), Mather Field (Philippine Islands).

Photo Section No. 3, Bolling Field; No. 5, Chanute Field; No. 8, Mitchel Field; No. 9, Fort Riley.

Air Park No. 3, Langley Field; No. 6 and No. 7, Mitchel Field; No. 8, Mitchel Field (Panama).

Headquarters 1st Balloon Group, Brooks Field.

Gunnery Detachment, Carlstrom Field.

Branch Intelligence Office No 11, Oahu; No. 12, Philippine Islands; No. 10, Panama; No. 1, Mitchel Field; No. 2, Kelly Field; No. 3, Crissy Field.

The Aviation Day at Mineola

The Aviation Day held on the Curtiss Field at Mineola on Sunday, Oct. 16, by the Aero Club of America through the cooperation of the Curtiss Aeroplane and Motor Corp., which loaned the field for the event, was a great and well deserved success. About thirty airplanes of all types and sizes, some of which had flown to Mineola from far cities, participated in the meeting which answered the purpose of showing the public the practical features of aviation. Although at times as many as a dozen machines were simultaneously circling over the field, or taking off, or landing, and no particular rules of the air seemed to be observed in these evolutions, it is gratifying to record that not the slightest accident occurred on the field or in the air. The credit of this splendid showing, which afforded the public the best possible demonstration of the safety and reliability of air transport, is due as much to the skill of the pilots as to the excellent ground maintenance which was in the hands of the aviation mechanics. The latter get, as a rule, little credit in print for their painstaking efforts upon which much of the success of safe flying depends, and this opportunity is taken to make good that all too frequent omission.

VIEW OF CURTISS FLYING FIELD ON AVIATION DAY, OCT. 16. THE GREAT VARIETY OF THE AIRPLANES PRESENT MAY BE NOTED

Purpose of the Meeting

The object of the Aviation Day, as was set forth in detail in our issue of Oct. 3, was to afford the public an opportunity of studying up to date airplanes both on the ground and in the air, that is, through an exhibition of aviation equipment on the field, and demonstration flights. In addition, a trophy presented by the Wright Aeronautical Corp. for the best completed demonstration of air transport was to be competed between Mineola, in the case of airplanes, or Port Washington, in the case of seaplanes, and any other locality to be stated beforehand by the contestants. The latter had to notify in a sealed envelope the Contest Committee of the Ae. C. A. of the nature of the contemplated flights, and of the advantages they were to represent over other means of transport.

The committee in charge of the Aviation Day was composed of Col. H. E. Hartney, chairman, Maj. W. G. Schauffler, C. S. Jones, Howard Scholle, Cole Younger, James B. Taylor, Jr., and Maj. Sidney B. Parker. Augustus Post, recording secretary of the Ae. C. A., was in general charge of records and Pilot C. S. Jones had charge of the field arrangements.

A detachment of New York Aerial Police Reserves under Major O'Keefe policed the field.

The Machines Present

The largest contingent of airplanes was entered by the Curtiss Aeroplane and Motor Corp., with three Orioles, three Jennies and the historic pusher biplane on which Glenn H. Curtiss won the 1911 race for the Gordon Bennett Cup at a speed of 47 m.p.h. For the Aviation Day this machine had been refitted with a 100 hp. Curtiss OXX engine, but otherwise it was exactly as it looked ten years ago, as many an old timer could see for himself. To aeronautical novices the ship must have looked strange indeed, with its exposed "dust pan" seat, its thin wings and bamboo tail outriggers. Despite its antiquated appearance this ten year old pusher biplane put up a remarkable performance when Pilot Bert Acosta took it up and raced over the field, for its speed must have been in the neighborhood of 80 m.p.h. Pilot Acosta seemed to be thoroughly enjoying the experience, although his steep banks, 10 ft. over the field (or over the heads of the spectators), were cause of much wrathful comment. Mr. Curtiss, who was watching the evolutions of his early trophy winner with visible tenderness, made a fitting remark when he said, turning to an old timer, "You know, the present motors really show us how good our airplanes were ten years ago." Perhaps this saying will again be applied ten years hence, for the present airplanes still seem ahead in their aerodynamical features of the engines available.

Nothing could better show the immense strides airplane construction has made in this ten-year period than the contrast offered by the 1911 Curtiss pusher and the up-to-date cabin airplanes that were on the field. Of the latter there were two J.L. all metal monoplanes and one Fokker F.3 monoplane, all making well over 100 m.p.h. with 185 hp., and carrying six passengers beside the pilot. In 1914 185 hp. would just have carried a pilot and a passenger at about 75 m.p.h., and in open cockpits at that.

Demonstration of Air Transport

The two business like looking J.L. monoplanes, with their comfortably appointed cabins attracted much favorable comment from all those who were able to examine them, and they came in for more praise from those who were fortunate enough to be taken as passengers on the J.L. piloted by John F. Petre which gave a demonstration of air transport according to the advance proposal to the Ae. C. A. between Curtiss Field and Miller Field, Staten Island. This machine made altogether five return flights on this route, carrying on each trip six passengers and pilot, 65 gal. of gasoline and 6 gal. of oil. The clocklike regularity with which this machine ran may be gathered from the fact that the time made on the ten trips only varied 5 min., the shortest trip being 21 min., and the longest 26 min.

The Fokker F.3 cabin monoplane, piloted by Bert Acosta, made its demonstration of air transport the previous day by making a return trip from Mineola to Providence, R. I., with six passengers. On the outward flight the flying time was 1 hr. 40 min., and on the return flight 2 hr. 19 min. The total gasoline consumption was 35 gal., and the total oil consumption 4.5 gal. The total useful load carried was 1189 lb.

The third demonstration of air transport was made by the Loening Model 23 flying yacht, on Oct. 14 between Port Washington and New London, Conn., and on Oct. 16 between Port Washington and Southampton, L. I. Three return trips were made on the first named route, 100 miles in length, and four return trips on the second named route, which is 78 miles

long. On the Port Washington—New London route, C. W. Webster, being the pilot, 120 gal. of gasoline and 6½ gal. of oil were altogether consumed, the flying time for the outward trips varying betwen 47 and 49 min., and for the return trips between 62 and 63½ min. On the Port Washington—Southampton trips, D. H. McCulloch being the pilot, the flying time for both outward and return trips varied between 38 and 43 min., and the total gasoline consumption was 132 gal., and the total oil consumption 7 gal. Considering the high speed at which these flights were made, and the low gasoline consumption, the Loening Model 23 flying yacht, which carried on each trip three or four passengers beside the pilot, gave a remarkable demonstration of modern seaplane transportation.

As the Judges' Committee of the Aero Club of America had not, at the time of writing, decided to whom of the three contestants the Wright efficiency trophy should be attributed, publication of the final results of the competition has to be held over to a coming issue.

The Remington-Burnelli airliner, with a maximum seating capacity of twenty-five in a spacious cabin, afforded a vivid example of the trend of commercial airplane design toward large sizes. Towering high above the other machines present, this twin-engined tractor, with its aerofoil shaped fuselage, presented an impressive sight when its big "passenger list" started going on board or stepping off.

Low Speed Flying

One of the most interesting machines shown was the Farman "Sport" two-seater tractor biplane. This ship, which is fitted with the 60 hp. Le Rhône engine, put up a remarkable performance, when the pilot, Captain D. H. Robertson took off time after time after a run of some 40 or 50 ft. and pointed her nose up to an angle of 45 deg., and continued climbing in this position straight as an arrow. The pilot also demonstrated the very low speed the machine is capable of, when he brought her to what looked as the stalling angle, and the ship, having lost nearly all her relative speed (not to be confused with air speed), simply started settling in a manner which reminded one of a person walking down a flight of stairs. This was a very valuable demonstration of the low speed at which some airplanes are capable of landing, a feature which has an important bearing on the safety of air transport. It is obvious that an airplane which can land at 25 or 30 m.p.h. and take off after a run of 10 or 15 yd., is ideal for cross-country flights for, as Captain Robertson remarked, it could be "sat" down upon a tennis court if the need arose.

While the Farman Sport plane was thus performing, two Farman pushers of the well known "egg crate" variety came over from Roosevelt Field, their headquarters, and circled over Curtiss Field with sightseers.

A High Lift Wing

Another highly significant demonstration of commercial flying was furnished by the Lawrence Sperry Aircraft Corp. This firm demonstrated its high-lift monoplane wing mounted on the fuselage of a Canuck biplane fitted with the 90 hp. Curtiss OX-5 engine. To what extent the Sperry high-lift wing improved the carrying capacity of this machine, which is a two-seater when fitted with biplane wings, was shown when Lawrence Sperry took the ship off with four passengers after a run of 300 yd. The useful load in this case was 1000 lb., and the weight of the machine empty 1100 lb. The climb, as officially recorded by an observer of the Ae. C. A., was 1000 ft. in 6 min., 1500 ft. in 9.1 min., 2000 ft. in 11.5 min., and 2500 ft. in 15 min. The speed, as measured over a 2-mile course, was 62 m.p.h. Considering the low horsepower used, the performance strikingly illustrates the commercial advantages of the Sperry high-lift wing.

The Lawrence Sperry Aircraft Corp. also exhibited a Messenger type airplane, built to the designs of the Engineering Division of the Air Service, and intended for quick communication work, and an Avro two-seater.

A Long Cross-Country Flight

The E. M. Laird Co. of Wichita, Kans., showed great enterprise in sending one of their Laird "Swallows" to the Aero Club meet. The three passenger OX-5 engined ship, piloted by Buck Weaver, chief pilot of the firm, left Wichita on Oct. 12 at 7.10 a. m., making its first stop at Kansas City, where an air mechanic, W. H. Burns, was picked up and carried as far as Chicago. A landing was made at Galesburg, Ill., for gas, and the ship reached Chicago one hour before dark Oct. 12. A stop-over of one day was made in Chicago. With Charles Dickinson, president of the Aero Club of Illinois, the Swallow took off at daylight Oct. 14, with the first landing at Bryan, O. From Cleveland the mail route was followed to Clarion, Pa., and Bellefonte, Pa.

Darkness overtook the plane near Plainfield, N. J., and a landing was made in a lot about two miles from the center of that town. On the following morning, October 15, the flight was continued to Hazelhurst Field, L. I.

It is interesting to note that Mr. Dickinson is a pilot at the age of sixty-three. While he does not claim to me the oldest pilot in the world, Mr. Dickinson undoubtedly learned to fly at a more advanced age than any other man.

Ten hours was the actual flying time of the Laird Swallow from Chicago to New York. 72 gallons of gas were used between these points. The oil consumption for the entire flight from Wichita to New York was only 2 quarts.

Both in the air and on the Curtiss Field the Swallow attracted much attention. Its controllability and quick get-away were commeneted upon by pilots, while in coming into the field Pilot Weaver gave numerous skilful exhibitions of slow speed and stall landings.

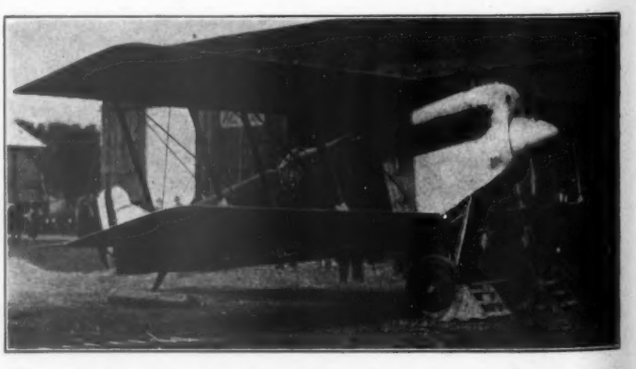
By far the smallest airplane present on the field—and in the air—was the Mummert biplane fitted with a 30 hp. Lawrance 2 cylinder horizontal engine. This little highly streamlined single-seater was a revelation to many visitors in showing how small an airplane can be built to fly.

Two S.V.A. biplanes and two DH-M airplanes of the Air Mail Serivce heightened interest in the meeting through their evolutions, and three Curtiss Orioles added a military touch to it by doing formation flying. The military element was further emphasized by the arrival from Quantico, Va., of a Marine Corps DH-4B, with Lieut. K. B. Collings, U.S.M.C., pilot, and Lieutenant Hale, observer, and of the Air Unit of the Maryland National Guard, under Major Jones. This Unit, which was made up of three Curtiss JN's, came from Baltimore, Md., under orders of Milton A. Reckord, Adjutant General of the Maryland National Guard.

While the various airplanes were busy demonstrating their special features or carrying passengers, a parachute competition took place over the field for the shortest distance between the landing point and a marker. This competition was won by Sergt. Joe Develin, A.S., with 43 yd., Sergt. F. Meeks being second with 130 yd., and Major Schauffler third with 175 yd.

The Wright Aeronautical Corp. exhibited in one of the hangars two of their well known engines, of the 180 hp and 300 hp. models, respectively, while in another hangar the Sperry Aircraft Corp. had on exhibition a large assortment of instruments.

At the close of the meeting a *thé dansant,* held in the field club house of the Aero Club of America, attracted a large and distinguished gathering.



THE FIAT 700 HP. RACER WHICH BRAK PAPA FLEW IN THE DEUTSCH TROPHY RACE
Photo Underwood & Underwood

Parachutes *

By Major T. Orde Lees

(Continued from our last issue)

Dozens of patents exist for making flying machines which incorporate the parachute principle.

To many minds, it seems that a descending parachute so nearly floats that it would not take much to make it do so. The fallacy is probably merely an optical and psychological illusion. Having no immediate background by which to gauge the speed of a descending parachute, the spectator, in spite of data to the contrary, often goes away with the impression that the man-carrying parachute floats on the air as lightly as its vegetable prototype, the parachute seed of the common dandelion. The inventive but unscientific observer proceeds to work out a scheme for making the parachute fly, claiming, with pride, that the passenger can laugh at derangements of the flying gear. Some, realizing the futility of making a parachute fly, have contented themselves with taking advantage of its descent to manipulate subsidiary flying gear or to test manual orthopters.

The two most widely known experimenters of this type of machine were De Groof, who dropped from a balloon at Chelsea where he fell 5,000 ft. and was killed owing to his wings folding over his head, and La Tour, who actually had flapped about a bit, but was killed at Lee Marshes through sheer bad luck. His apparatus was suspended below a balloon. It seems that the aeronaut lost his head and acted too late for the flying machine to clear some trees. He immediately afterward tried to land. La Tour was mortally injured by being dragged. He was French and spoke no English, while the aeronaut spoke no French. No interpreter was in the balloon, so cooperation was at a discount.

The parachute is incompatible with the aerofoil as such. Many unscientific people cannot understand why it is that airplane wings do not act, or cannot be made to act, as parachutes when a machine falls or stalls.

Well, they do sometimes, but owing to the immense weight in proportion to wing area—as much as 10 lb. to the square foot in modern machines—the speed of descent would be fatal.

What a Parachute Carries

A life-saving parachute, 28 ft. in diameter, carries half a pound per square foot for an average man of 160 lb. when opened to a diameter of 20 ft. This gives a speed of descent of 16 ft. per second, 1,000 ft. per minute, or approximately 12 m.p.h. A parachute attains its terminal velocity within a second after opening. The momentum of the load is very rapidly absorbed. Any increase in the load or decrease in the area increases the speed. The resistance varies inversely as the square of the speed so that fortunately stout parachutists will find that the normal size life-saving parachute will not bring them down much faster than their lighter brethren.

Owing to her girl companion fainting when about to do a double descent from a balloon, Miss Dolly Sheppard, a prewar professional parachutist, courageously seized her in her arms and brought her down on her parachute without fatal, though considerable, injuries.

On two occasions during the war, two officers have accidentally descended from their balloons on a single one-man parachute. On one of these occasions the burst balloon as well came down with the two officers on the one parachute. Lieutenants Pape and Jardine, the two observers in question, were somewhat badly injured on landing.

The original Bleriot airplanes were so lightly constructed, on account of their tiny 25 hp. Anzani engines, that there are one or two cases on record where they pancaked down from considerable heights in true parachute fashion and without serious damage to pilot or machine; but these cases are rare owing to the center of gravity and center of lift not coinciding.

Thirty feet per second, double ordinary parachute speed, is generally considered to be the limit of speed at which a human being could strike the earth without serious harm.

For descents on to hard ground the minimum diameter for a parachute as cut at present should be 28 ft. In flight the "fluting" of the periphery reduces the diameter to about 18 to 20 ft. according to the weight of the load. G. I. Taylor the mathematician, has designed a wonderful parachute which comes down at its designed diameter without "fluting".

Mr. Herbert Spencer has used a parachute of only 16 ft. in diameter. None but a very experienced parachutist could survive repeatedly the speed at which a 16 ft. parachute descends. A descent into water from any height may be made with impunity with a parachute of only 10 to 12 ft.

For use on all aircraft having a speed of their own and on captive balloons which have, of course, a relative air speed, due to wind, it is necessary to pack the parachute in some form of container. On free balloons, owing to the fact that there is no relative air speed, the parachute may be hung fully extended in length from the equator of the balloon. This is the usual practice among professional parachutists. The first attempt to pack parachutes was the Spencer "C" type case, evolved at the instigation of Air Commodore Maitland. It was used with success throughout the war on all kite-balloons and on some airships. Owing to the likelihood of the parachute being blown out of this case before the aviators has dropped the full length of the parachute, and the tendency, therefore, for the slack silk of the parachute to get foul of the airplane and tear or tangle, the Spencer "C" case is not suitable for use on airplanes.

When it was decided, two months before the end of the war, to equip airplanes with parachutes, the only one on the market in large quantities was the Guardian Angel A.1 type. There are fifteen types of Guardian Angel parachutes, of which A.1 and several others are extracted, by the weight of the falling aviator, from cases pendant from the airplanes. The packing is elaborate and takes two or three hours, but as they are issued from the factory ready for use and need no repacking for a couple of years or more, while a Spencer and most other parachutes require repacking weekly, this is not a serious objection.

Parachuting from Disabled Airplanes

It is disputed by many persons that parachutes of this normal type (termed by Colonel Holt anchored parachutes) are capable of being used when the machine is out of control. It is often objected that parachutes must foul the machine in a spin. This is not necessarily the case at all. The smallest machines take at least three seconds to make a complete turn when spinning. In three seconds the parachutist is already over a 100 ft. below the point in the air from which he started. If the suspension cord of a normal type parachute container be made sufficiently long, as suggested by Major Mostyn, the container is clear of the machine before the parachute is extracted, whatever the position of the airplane may be. If the suspension cord be long enough it is immaterial whether the airplane winds it round the fuselage half a turn or so during the spin. The propeller is a possible danger, of course, but it is that on the ground if you try to stop it with your head. If the suspension cord gets foul on the propeller it must be instantly severed, but such an occurrence will be rare and no one claims that parachutes will save 100 per cent of men who use them any more than liftbelts and lifeboats do. In certain cases the knapsack type parachute (such as the Autochute, Floyd-Smith and Mears, to mention three prominent systems of this type) may be less prone to fouling the airplane, but there is nothing to prove it yet. So far the claims of their inventors rest on conjecture, except perhaps the Mears, which is closely allied to the German Heinecke parachute, the one that has made over 500 drops from airplanes on active service.

It is well known that the anchored type of airplane parachute has been ripped on the tail skid on two or three occasions. This is due merely to the fact that the suspension

* Lecture delivered before the Royal Aeronautical Society

cord was too short. If the suspension cord is made long enough the case must be clear of the tail before the parachute is extracted from it. The only reason why this is not done on demonstration work is that it increases the length of free fall. All demonstrators naturally like to reduce this as much as possible.

An efficient shock absorber must be introduced into this line or the kinetic energy of the container, when it comes to the end of the supporting line, might cause the line to break.

The Pack Parachute

It is claimed by other inventors that the parachute stowed in a knapsack on the aviator's back and extracted therefrom when the latter jumps, either by means of a line attached to the airplane, as in the Mears and German Heinecke parachutes, or by the miniature pilot parachute, as in the well known Autochute, Floyd-Smith and Broadwick systems, is far less likely to foul the airplane than the original anchored type of parachute. Others contend that the pilot parachute is just as likely to be carried by the slipstream into the tail unless operated intelligently (but who ever heard of panic-stricken passengers acting intelligently?)

In spite of the natural objection of pilots to be saddled with a 16 lb. knapsack, this type has found a good deal of favor in America. In quite a number of the American patterns the aviator is required to jump headlong into space and deliberately liberate the parachute by means of pulling a ring or handle on his chest when he considers that he is well clear of the machine. This particular method of operation does not seem at all suitable for passenger work, as the passengers, if they could be persuaded to jump at all, might either liberate the parachute prematurely in their embarrassment and so cause it to foul the machine, or might fail to operate it altogether.

The pilot parachute idea is sound so long as it is not left to the aviator to extract or release the pilot parachute himself. This must and easily can be done automatically, and not until the aviator is well clear of the machine.

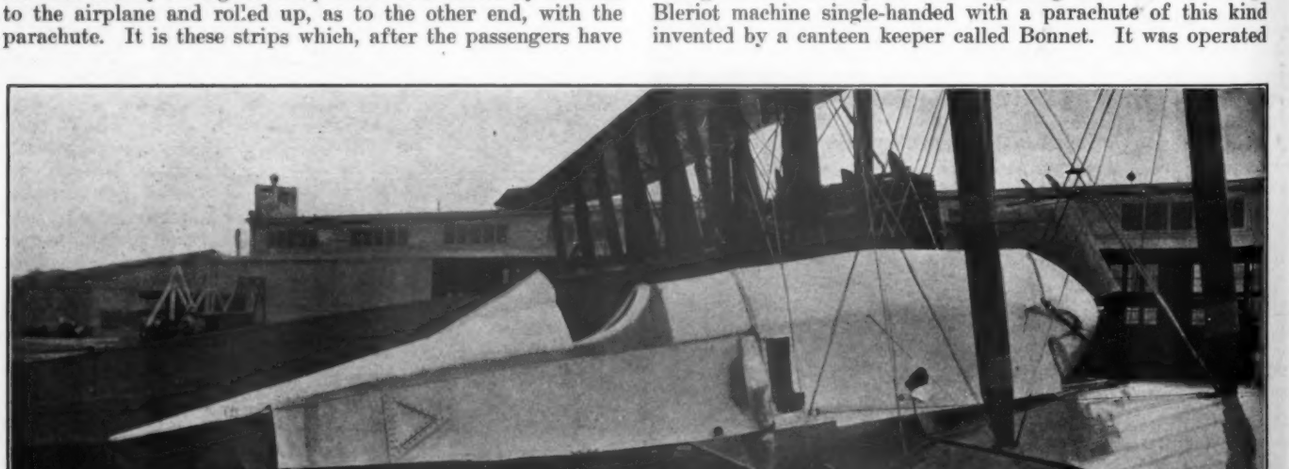
The Mears is a simple and excellent proposition and for multi-passenger machines the best existing solution, because the passengers can quit in any order, through any exit, having nothing to do but jump, and because the operating attachments left behind on the machine cannot possibly foul the passengers who jump last. It also has the advantage that its extraction from its knapsack case can be delayed until the passenger is radially clear of the machine. In principle it is merely rolled up in the knapsack from which it is extracted and unrolled by a long flat strip which is attached by one end to the airplane and rolled up, as to the other end, with the parachute. It is these strips which, after the passengers have jumped, remain attached to the machine and blow harmlessly to the rear.

There is one other kind of airplane parachute, the extraction type, often termed soaring parachutes, though the impossibility of a parachute actually soaring over a fast moving airplane must be apparent to everyone. The idea is quite ideal and in spite of what has just been said is not absolutely impossible. The attention of inventors should be concentrated on this difficult problem.

Extraction Parachutes

Experiment alone can prove whether the parachute thrown up above the machine would exert a pull sufficient to lift the aviator from his seat, before the axis of the parachute, and consequently its pull, was in line with or parallel with the line of flight of the machine. As the line of flight forms so small an angle with the axis of the fuselage in modern machines the successful operation of the extracting parachute can be decided only by practical tests. In any case the parachute, however it may be projected above the machine, must lose its forward momentum almost simultaneously with the commencement of its development. Before it is fully open it is bound to travel rearward through an arc having the parachute's point of attachment to the machine or aviator as its center. It is doubtful whether it can develop sufficiently to exert a pull strong enough to extract the aviator from his seat until it has the pull in a direction which imperils the aviator by collision with the tail of the machine, especially the stabilizing fin and rudder. If a machine is stalling or falling its axis may be at a sufficient angle to the line of flight to obviate the danger of decapitation by the rudder, etc. Whether the aviator could survive the shock of being whisked out of the machine is a little problematical. In the normal type parachute the strain of having one's momentum arrested, even after a fall of several hundred feet, involving a speed of 95 m.p.h. after a fall of 300 ft. or more, is almost negligible. There seems therefore no reason why the actual act of extraction should in itself prove fatal. At the same time it does not matter whether the aviator is dragged out of the machine in his seat or by means of body harness, the strain of his transmission ultimately falls upon him. It may be that the cone of air set up by the slipstream would cause the parachute to the function at an angle of 10 deg. or so to the axis of the machine, and it may be that the steeper the machine was diving the more the action of this type of parachute would be favored. Rollers on the back of the occupant's seat to lift him, seat and all, with an initial trajectory sufficient to clear the empenage have been suggested by Haydn among others.

Pégoud did actually succeed in getting clear from a 25 hp. Bleriot machine single-handed with a parachute of this kind invented by a canteen keeper called Bonnet. It was operated



DETACHABLE FUSELAGE FOR USE WITH PARACHUTES ATTACHED TO A MARTIN BOMBER FOR TESTING

by means of a pilot parachute. It is interesting to note that the first drop ever made from an airplane in Europe was operated by the pilot-parachute system. Pégoud's machine, continuing on a mad career by itself, looped the loop, which suggested to him the possibility of his doing likewise. It finally landed almost intact.

A third essay by Pégoud's pupils Lemoine and Bourhis for a fee of £1,000 ($5,000) at Vienna nearly proved fatal. Everything went wrong. Part of the metal sheath which covered the parachute fouled and damaged the empenage and elevators. Lemoine, the pilot, crashed and was in hospital for three months, while Le Bourhis, the parachutist, came down at almost fatal speed on half a parachute and broke his leg.

First Airplane Parachutist an American

The very first man to drop from an airplane by parachute was an American named Berry at St. Louis in America, just 12 months in advance of Pégoud; the first man in England, Professor Newall, the first woman, Miss Broadwick, in America, and Miss Sylvia Boyden in England, who has since done much to prove that parachuting is not dangerous.

The path taken by a parachute is rather interesting. Instinctively one thinks that a parachute drawn out from a container below a flying airplane will describe a rearward and downward path in a straight line at an angle of about 45 deg. to the airplane. A little further consideration confirmed by photographs shows that the exact opposite is the case.

Parachutes do not conveniently slow up like lifts on reaching the ground. The landing is often much more severe than is generally supposed, especially in a high wind, as the parachute has the speed of the wind in a horizontal direction over the ground. In a wind of 30 m.p.h. one might just as well jump off the roof of a closed motor car going at that speed. On October 3rd last year, Miss Boyden established what is easily a record for contempt of danger by jumping from a machine when the wind was 90 m.p.h. in the air and 60 m.p.h. on the ground. She jumped at 300 meters, drifted 2,800 meters, using a 28 ft. parachute. She luckily landed in a marsh almost unhurt, but narrowly escaped drowning. She might just as well have jumped out of the Holyhead express going at full speed.

Swinging, which often occurs during the descent, may cause the aviator to land heavily on his back or even head. Within narrow limits, a parachute may be guided if the passenger is within reach of the rigging lines, but owing to the length of life-line necessary to connect the aviator to his parachute, in some types of airplane parachutes the means of dirigibility are usually beyond his reach.

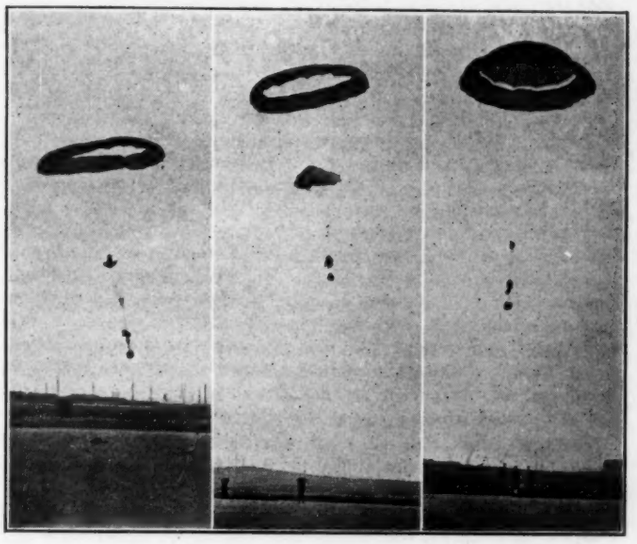
For military use devices for reducing the effective area by peripheral contraction of the mouth or otherwise so that the speed can be greatly increased in order to avoid the attentions of an aerial enemy who persists in amusing himself by firing at the parachutist, may be useful.

Parachutes are Reliable

It is quite a general opinion to suppose that parachutes frequently fail to open. That opinion is wholly fallacious. During the war the ordinary parachute stuffed, more or less anyhow, into the Spencer C. case only failed to open once in every two hundred times. Failure to open is due to the fact that the rapid descent of the parachute converts the vent-hole at the apex into an air ejector; a vacuum is thus formed inside the parachute. The vacuum causes the sides to stick together and so tends to keep the mouth closed. In 199 cases out of 200 air enters at the folds of the mouth and, overcoming the vacuum, inflates and develops the parachute. In the Autochute this tendency is ingeniously and simply overcome by inserting a sheet of paper inside the vent hole of the parachute, thus preventing the formation of a vacuum there. If it has not already done so before the paper bursts as soon as the parachute is fully open and has taken up its load.

In the French Ors parachute, the American Folmer Clogg and the English Blackburn, Salvus and Guardian Angel, the mouth of the parachute is automatically and positively opened as the parachute leaves its container. This makes failure to open impossible. Positive opening is a vital necessity on all parachutes. Without it there is no certainty how soon the parachute will open or whether it will open at all. Anyone will agree that unless you can rely upon a parachute opening before it has fallen, say 150 ft. the parachute is practically useless for airplane work, where so many of the accidents and derangements occur near the ground. It is equally important that the parachute should not open too soon or it may get foul of the falling machine. The ideal parachute must do the same thing in the same way in the same time, time after time. It ought to be possible to arrange or predict with precision the exact distance the aviator will fall before the parachute opens. With equal speeds and weights the depth of free fall must be constant.

Next in importance to positive opening is positive extension, that is, the extension lengthwise ought to be effected by some positive reaction and not merely by air friction or inflation of the parachute.



DOUBLE STAGE PARACHUTE IN VARIOUS POSITIONS OF UNFOLDING

The more positive and the better controlled these operations are, the more reliably will the parachute function.

During the war, quite five per cent of parachutes emerged from their cases with tangled rigging lines. In several cases the tangles were so close up to the parachute that the mouth only partially opened, the terminal velocity was excessive, and the aviators were severely injured. Tangling can be obviated only by making the rigging lines tangle-proof; this has been done by one maker. It is an indispensable safeguard and should be universally adopted. It is not difficult to do.

To be entirely practical, a parachute must be installed in an airplane so that it can be automatically delivered to either side of the machine when the machine is in any position. The system of installation necessarily differs with the different types of machines. In single and two-seaters, the parachutes, if not of the knapsack type, are usually installed in compartments in the fuselage from underneath which they issue automatically on the fall of the aviator, or in the top fairing, whence they are ejected by means of catapults operated automatically.

By far the greatest danger of parachuting is landing. One may land on a house, on live wires, or in front of a train. If there is a strong wind blowing, the aviator is dragged along the ground, and seriously injured or killed, by the parachute acting as a sail. The power of a parachute impelled by the wind is incredible. Six strong men are helpless to hold it in only a 30 mile an hour wind. A sharp knife is often supplied for the purpose of severing the life-line on landing, but it is just as often forgotten at the moment of jumping or lost on landing. The only real safeguard is some form of quick release, of which there are very many patterns. The quick release must be proof against tampering on the way down, and against premature operation, or it will kill more than it will save. The most dangerous predicament is to land on the roof of a building in a wind. Nothing but an instantaneous

release and prompt action will prevent the parachutist from being dragged off by his parachute and killed. Viola, a professional lady parachutist, was killed in this way at Coventry in 1911. She landed on the roof of the Centaur Cycle Works.

Demonstration drops from airplanes are usually made by experienced parachutists under the most favorable conditions from machines flying on an even keel over safe ground. The demonstrators do not, as a rule, trust themselves to quick releases, but if a wind is blowing they take care to extricate themselves from their harness shortly before reaching the ground. The unreality of demonstration drops has often been criticized as forming no criterion as to what would happen and how people would act in an aerial emergency. Opinions naturally differ widely on this conjectural point. It is said that the passengers would not, and often could not, quit the machine. It is, however, merely a question of incentive and of personal selection.

In cases of fire in the air, happily rare, but not yet entirely extinct, people would jump without thinking twice. There is always the reflection that if you jump you may be killed, but if you remain in the machine you are certain to be.

Panic will seize air passengers, just as it seizes people in earthquakes, shipwrecks, etc., but those that keep their heads will make use of their parachutes if in their discretion it is imperative to do so.

The saving of passengers by parachute from multi-passenger machines is the biggest problem that the parachute expert has to solve. A solution has just been patented in which one huge parachute has been designed to lift from the airplane the cabin complete with its human contents, even at a few feet from the ground. The decision and operation are placed in the hands of the pilot. The invention needs trying out and development. Its principal advantage is that the passengers are not called upon to think for themselves.

To assert, as is often done, that aerial accidents can be totally eliminated, is most pernicious, however bona fide that opinion may be in the minds of the people who state it. Aerial accidents can be eliminated no more than railway accidents, shipwrecks, and thunderstorms, in all of which every possible safeguard is provided. Life-saving equipment is only one of the safeguards. In no kind of transit is reliance placed wholly on life-saving gear to the exclusion of all other precautions, nor is life-saving gear expected to save more than a percentage of the passengers. The most ardent enthusiast does not claim that parachutes will save more than fifty per cent of passengers, because you cannot expect stout gentlemen and old ladies to act with the experienced agility of German pilots, whose escapes at present provide the only available statistics of life-saving from airplanes, nor will parachutes save passengers in taking-off and landing crashes.

Reduction in Naval Air Service

The curtailment of the activities of the Navy Air Service up to date has closed the stations at Cape May, N. J.; Yorktown, Va. (branch of the Hampton Roads Air Station), and Rockaway, N. Y. This leaves operating stations on the Atlantic Coast at Hampton Roads, Va., Lakehurst, N. J., Anacostia, D. C., and Pensacola, Fla., and on the Pacific coast at San Diego, Calif. Of these the Hampton Roads and the San Diego stations are the only sizeable ones now existing, as far as the Navy is concerned.

Due to the crash in England of the R-38 the airship station at Lakehurst is in a peculiar situation. What will be done with the station remains to be worked out following the financial settlement over the R-38, which will soon be taken up with the British government. If it is possible to obtain—as some of the high officers of the Bureau of Naval Aeronautics hope—one of the British dirigibles as part payment in the settlement, the activities at the Lakehurst station will be resumed. Otherwise they will cease for about a year, when it is expected that the airship ZR-1, now building at the station, will be completed.

The Anacostia station, just outside of Washington, is maintained largely for experimental purposes. It is not regarded as an ideal naval air station in the accepted sense.

The station at Pensacola serves for training purposes, to supply fliers for the Atlantic and Pacific fleets.

The reductions are due to the failure of Congress to provide sufficient funds for the maintenance of the additional stations. The appropriation for the current fiscal year amounts to $13,300,000, which includes funds for new aircraft.

Trans-Canada Air Route

In response to a request received from Sir Ross Smith, the Civil Aviation Branch, Air Board of Canada, has recently mapped out a combined airplane and seaplane route across Canada from Kodiak Island, Alaska, to St. Johns, Newfoundland, which is it proposed should constitute the Canadian section of the "Round-the-World" Flight.

For the information of those who may be more particularly interested, there is printed below a statement showing the proposed route across Canada from West to East, together with the distances between suggested stops and particulars as to the housing, repairing and refuelling facilities available along the various stages of the journey. A supplementary statement is also included, giving similar particulars for a suggested detour to the South on arrival at Winnipeg, in order to call at several American cities, such as Chicago, Pittsburgh, New York, etc.

SUGGESTED TRANS-CANADA AIRPLANE AND SEAPLANE ROUTE FROM KODIAK ISLAND, ALASKA, TO ST. JOHNS, NWFLD.

ROUTE	APPROX. DISTANCE	REMARKS.
Kodiak Island, Alaska to Wrangell, Alaska.	700 miles.	*Wrangell.* Mouth of the Stikine River. Petrol, oil and machine shops.
Wrangell to Prince George, B. C.	450 miles.	*Prince George.* Sub-division west of town. 400 x 200 yds. Winds westerly and easterly. Major Peary and Lt. Daniels ex R.A.F. Ground rough and landing place small.
Prince George to Edmonton, Alberta.	450 miles.	*Edmonton.* May-Gorman airdrome. 3½ miles N W of City, 800 x 600 yds. Petrol, oil and mechanics.
Edmonton to Moose Jaw, Sask.	450 miles.	*Moose Jaw.* Airdrome N W of station. 400 x 600 yds. Petrol, oil and mechanics. (Western Aeroplane Co.)
Moose Jaw to Winnipeg, Man.	400 miles.	*Winnipeg.* Airdrome 5 miles W of City. 500 x 300 yds. Petrol, oil and mechanics. (Canadian Aircraft Co.)
Winnipeg to Fort William, Ont.	385 miles.	*Fort William.* Harbor, Petrol, oil and machine shops.
Fort William to Sault Ste. Marie, Ont.	280 miles.	*Sault Ste. Marie.* Harbor. Petrol, oil and machine shops.
Sault Ste. Marie to Montreal, P. Q.	525 miles.	*Montreal.* Harbor. Vickers, Ltd. Petrol, oil and machine shops.
Montreal to Fredericton, N. B.	455 miles.	*Fredericton.* Harbor. Petrol, oil and machine shops.
Fredericton to Sydney, Cape Breton.	360 miles.	*Sydney.* Harbor. Petrol, oil and machine shops.
Sydney to St. Johns, Nwfld.	420 miles.	*St. Johns.* Harbor. Petrol, oil and machine shops.
Total distance	4875 miles.	*St. Paul.* Twin City Field.

SUGGESTED SUBSTITUTE ROUTE BY WAY OF CHICAGO AND NEW YORK

Winnipeg to St. Paul, Minn.	2450 miles (From Kodiak Island). 400 miles.	Government aerodrome.
St. Paul to Chicago, Ill	360 miles.	*Chicago.* Grant Park Aviation Field. Government Mail Field.
Chicago to Pittsburg, Pa.	420 miles.	*Pittsburg.* Thornbury Country Club Golf Course. Emergency landing field.
Pittsburg to New York, N. Y	440 miles.	*New York.* Gallatin Field, No. 1, Aerial Police Force.
New York to Yarmouth, N. S.	500 miles.	*Yarmouth.* Harbor. Petrol, oil and machine shops.
Yarmouth to Sydney, C. B.	400 miles.	*Sydney.* Harbor. Petrol, oil and machine shops.
Sydney to St. Johns, Nwfld.	450 miles.	*St. Johns.* Harbor. Petrol, oil and machine shops.
Total distance	5420 miles.	

Note:—All information regarding airharbors situated in American territory is based on reports received from outside sources and cannot therefore be vouchsafed as accurate. For more reliable particulars application should be made to the Chief of Information Group, U. S. Army Air Service, Washington, D. C., U. S. A.—*General Progress Report No. 8, Air Board, Ottawa, Can.*

"Single Engined Cabin Airplanes" Discussed

The publication, in our issue for Sept. 26, of the article Single Engined Cabin Airplanes by Donald W. McIlhiney, has elicited a number of interesting communications from our readers, which contribute additional information on some of the commercial airplanes tabulated in the article referred to above. Following are two of these letters, with a reply by the author of the article.—EDITOR.

Editor, AVIATION AND AIRCRAFT JOURNAL:

The writer has read with interest the article in your Sept. 26 issue "Single Engine Cabin Airplanes" by Donald W. McIlhiney. In this article there are many points of interest concerning the comparison of various machines. The writer has thought for sometime that there has been some erroneous impressions concerning comparisons.

I believe you have submitted a very excellent formula in *Aircraft Journal* for Nov. 8, 1920 for the Figure of Merit. It is given by this formula.

$$\frac{V\text{-}(90_{\text{per cent max}}) \times \textit{pay load} \times \textit{range}}{V_{\text{landing}} \times \textit{power}} = \text{Figure of Merit}$$

This basis of comparison should give a fair estimate of the value of a commercial airplane. Of course, there are all kinds and varieties of formulas for this work, but if you take this formula as taken in the "Single Engine Cabin Airplane" article as a starting point many interesting items can be learned.

The idea that I believe is under discussion, or is in doubt in my mind, is the comparison of the Junker JL6. In the table for the Junkers JL6, the horsepower is given as 185, the useful pay load at 655 lb., the maximum speed at 111 m.p.h., the landing speed at 44 m.p.h., the range as 777 miles, and the figure of merit as 6246.

From various sources and by observation of the Junkers machine which is now at the Mercury field the writer believes that the following figures drawn from various sources which may be taken as accurate as they are thought to be thoroughly reliable are as follows:

The high speed 111 m.p.h., the pay load 655 lb., the range 777 miles. These items are in agreement with published data in the table. But the low speed, 52 m.p.h., and the horsepower, 243, are at variance with the table.

There is considerable question as to what *is* landing speed and how it is properly defined, and the test results brought out properly. It would seem to the writer that the only basis of comparison is the slowest speed at which the machine will maintain horizontal flight.

In comparing the Curtiss Eagle, we find the top speed 100 m.p.h., and the low speed 51 m.p.h. These figures seem to be correct from viewing the performance of the three engined Curtiss Eagle which I have seen fly, and it seems obvious that the slow speed of 44 m.p.h. on the Junkers is at considerable variance with all past experience.

We know that the Junkers is extremely hard to handle at low speed and do not feel or have I seen the Junkers land at a speed which would correspond to anything like 44 m.p.h.

In the assumption that the landing speed is 52 m.p.h., and the horsepower 243, we then get roughly a figure of merit of 3990 for the Junkers. This seems to be more or less correct.

If we were truly going to compare monoplanes with biplanes, we must take into consideration a further factor, namely the same mileage basis for the same gasoline consumption. For instance, in the Eagle we will probably get gasoline consumption of something like 0.55 lb. per horsepower/hour. If we compare the Junkers on this basis, we then find that the range about is 4.25 hr. instead of 7 hr., a difference of 2.75 hr. The mileage works out approximately as 467 as against that, previously given, of 777.

This new basis then leads us to another comparison where we have the mileage change and gives us a new figure of merit when we consider the mileage change the slow speed change and the horsepower change. This new figure then is approximatly 2410, for the Junkers. We therefore see that as an interesting example the Curtiss Eagle, even though it is a biplane, has a figure of merit which is of interest.

The American Jacuzzi also has a higher figure of merit than the Junkers. On the Coast we can readily explain a high figure of merit on the Jacuzzi ship and it seems reasonable that it should check very closely to the Curtiss Eagle at this time under the conditions which are known.

In the connection of comparisons may I offer my suggestions that possibly there is an inflated value in many of the foreign performances among which are namely the Fokker, the Junkers, the Zeppelin. I am merely checking these for the simple reason that they use the B.M.W. engine.

After such cases as outlined above were through we would find a considerable discrepancy in the performance of the monoplane when the engine element was left out. Of course, we have to admit that the engine is part of the airplane as a whole, but if one is comparing monoplanes, biplanes, triplanes, and other forms of aerodynamic combinations we must necessarily leave out of the formula the element of an increased range due to better or inefficient engine.

G. EDWARD BARNHART

In response to the above Mr. McIlhiney wishes to point out the following:

"The above letter illustrates what an approximation any figure of merit must be. Mr. Barnhart speaks of the JL-6 from actual experience and reaches conclusions quite different from those in the article "Single Engine Cabin Airplanes". In regard to the horsepower of the B.M.W.-3a it should be pointed out that although this engine will give 243 hp. on the ground, it is obtained by overstraining the engine. The engine is designed to give 185 hp. on the ground. The auxiliary throttle is an altitude control and should never be used below 5,000 ft., except in emergencies.

"The landing speed given in the table was obtained by assuming a maximum K_y of 0.0044 which takes into account the effect of speed and scale and the thickness of the wing. Due to other features than maximum lift the practical landing speed may be higher but cannot very well be calculated from published data.

"Eliminating the effect of the engine in comparisons between monoplanes and biplanes is a very good point as it allows the aerodynamic features of various machines to be compared directly. It should not be included in a figure of merit as such a figure attempts to rate the entire design."

Editor, AVIATION AND AIRCRAFT JOURNAL:

In a recent article on single-engined cabin airplanes, we note that the Ansaldo A300C is described as a four-passenger plane with a cruising radius of 590 miles.

As a matter of fact the A300C Ansaldo, of which model five planes have already been imported into this country, carries six passengers including the pilot, and has a radius of flight of only 490 miles at the utmost, computing fuel consumption at 18 gal. per hour for 5 hours at 90 m.p.h.

The fuel load of the plane is 585 lb. for gasoline and 80 lb. for oil, a total of 665 lb. Assuming 170 lb. for pilot, the total non-paying load of the plane is 835 lb. Subtracting this figure from the maker's specified total useful load of 1653 lb., the paying load will be found to be 818 lb. As a matter of fact, Eddie Stinson has successfully flown this plane in Mexico, taking off at 3500 ft. elevation, with full fuel tanks and a pay load of almost 1000 lb.

The figure of merit as computed by Mr. McIlhiney, instead of 3245, will be found in view of the above corrections to be 3385.

It may interest some of your readers to know that Ansaldo has a new commercial model, called the A300T, which carries a pilot and seven passengers over a 310 mile radius, at the same speed as that of the A300C. The plane is identical with the present model except that a larger pay load is carried, at the expense of fuel.

ARCHIBALD JOHNSTON

ON TO KANSAS CITY AND OMAHA!

¶ By all means go to the American Legion Aviation Meet at Kansas City, October 31, November 1 and 2, and to the International Aero Congress at Omaha, November 3 4 and 5, whether you find it necessary to walk, ride or fly.

¶ These events will undoubtedly prove a revelation to visitors who are unfamiliar with the progress of aviation in the middle west and the way they do things out there.

¶ But whether or not you go or are one of the few unfortunate stay-at-homes, you will wish to review these big aviation events in perspective.

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For the real story, in word and picture, for accurate information on the entrants, performances and technical details, as well as the conclusions of experts

Read the Special Issues of

AVIATION AND AIRCRAFT JOURNAL

of November 14 and 21

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